

Name: Solutions

Write an equation of the polynomial function in standard form for each set of zeros given.

1. The solution set is $\{1, 2, 3\}$, and the polynomial has degree 3

$$\begin{aligned}f(x) &= (x-1)(x-2)(x-3) \\f(x) &= (x-1)(x^2-5x+6) \\f(x) &= x^3-6x^2+11x-6\end{aligned}$$

2. The solution set is $\{-2, -3, 4\}$, and the polynomial has degree 3

$$\begin{aligned}g(x) &= (x+2)(x+3)(x-4) \\g(x) &= (x+2)(x^2-x-12) \\g(x) &= x^3+x^2-14x-24\end{aligned}$$

3. The solution set is $\{-1, \frac{1}{2}, 5\}$, and the polynomial has degree 3

$$\begin{aligned}K(x) &= (x+1)(2x-1)(x-5) \\K(x) &= (2x-1)(x^2-4x-5) \\K(x) &= 2x^3-9x^2-6x+5\end{aligned}$$

$$x = \frac{1}{2} \quad 2x = 1 \quad 2x-1 = 0$$

4. The solution set is $\{0, \frac{1}{3}, -6\}$, and the polynomial has degree 3

$$\begin{aligned}P(x) &= (x-0)(3x-1)(x+6) \\P(x) &= x(3x-1)(x+6) \\P(x) &= x(3x^2+17x-6) \\P(x) &= 3x^3+17x^2-6x\end{aligned}$$

$$x = \frac{1}{3} \quad 3x = 1 \quad 3x-1 = 0$$

5. The solution set is $\left\{\frac{3}{2}, -\frac{3}{2}, 4\right\}$, and the polynomial has degree 3

$$f(x) = (2x-3)(2x+3)(x-4)$$

$$f(x) = (x-4)(4x^2-9)$$

$$f(x) = 4x^3 - 16x^2 - 9x + 36$$

$$x = \frac{3}{2} \quad 2x = 3 \quad 2x-3=0$$

$$x = -\frac{3}{2} \quad 2x = -3 \quad 2x+3=0$$

6. The solution set is $\{-1, 2\}$ with 2 as a double root, and the polynomial has degree 3

$$g(x) = (x+1)(x-2)(x-2)$$

$$g(x) = (x+1)(x^2-4x+4)$$

$$g(x) = x^3 - 3x^2 + 4$$

7. The solution set is $\{2\}$ with 2 as a triple root, and the polynomial has degree 3

$$K(x) = (x-2)^3$$

$$K(x) = (x-2)(x-2)(x-2)$$

$$K(x) = (x-2)(x^2-4x+4)$$

$$K(x) = x^3 - 6x^2 + 12x - 8$$

8. The solution set is $\{-1, 2\}$ with -1 and 2 as double roots, and the polynomial has degree 4

$$P(x) = (x+1)(x+1)(x-2)(x-2)$$

$$P(x) = (x^2+2x+1)(x^2-4x+4)$$

$$P(x) = x^4 - 4x^3 + 4x^2 + 2x^3 - 8x^2 + 8x + x^2 - 4x + 4$$

$$P(x) = x^4 - 2x^3 - 3x^2 + 4x + 4$$